

Nuclear Power in California: 2005 Status Report

Committee Workshop on Issues Concerning
Nuclear Power
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Presentation Outline

1. Historical overview
2. California's operating nuclear power plants
3. Status of key nuclear energy issues
4. Implications for California

1. Historical Overview

Historical Overview

- ❑ Late 1960s-1970s: Nuclear power became part of California's energy supply portfolio
- ❑ 1970s: Debate over benefits, costs, and risks of nuclear power
 - Acceptable waste disposal/storage solution was a key policy concern
- ❑ 1976: California nuclear legislation: halt new construction of nuclear power plants
 - Diablo Canyon and SONGS exempted

Historical Policy Issues

- ❑ Nuclear power role in energy supply mix
- ❑ Costs vs. benefits of nuclear power
- ❑ Location of nuclear power plants on California coast
- ❑ Seismic safety and competing uses of coastal sites
- ❑ What are acceptable risks?
- ❑ Nuclear spent fuel disposal solutions

California Nuclear Law

1976: Legislation prohibited construction of any new nuclear power plants until the Energy Commission found:

The United States through its authorized agency has identified and approved, and there exists a technology for the construction and operation of, nuclear fuel rod reprocessing plants. (PRC 25524.1)

The commission finds that there has been developed and that the United States through its authorized agency has approved and there exists a demonstrated technology or means for the disposal of high-level nuclear waste. (PRC 25524.2)

1977: Commission held hearings, conducted investigation

1978: Commission concluded that these findings could not be made at that time

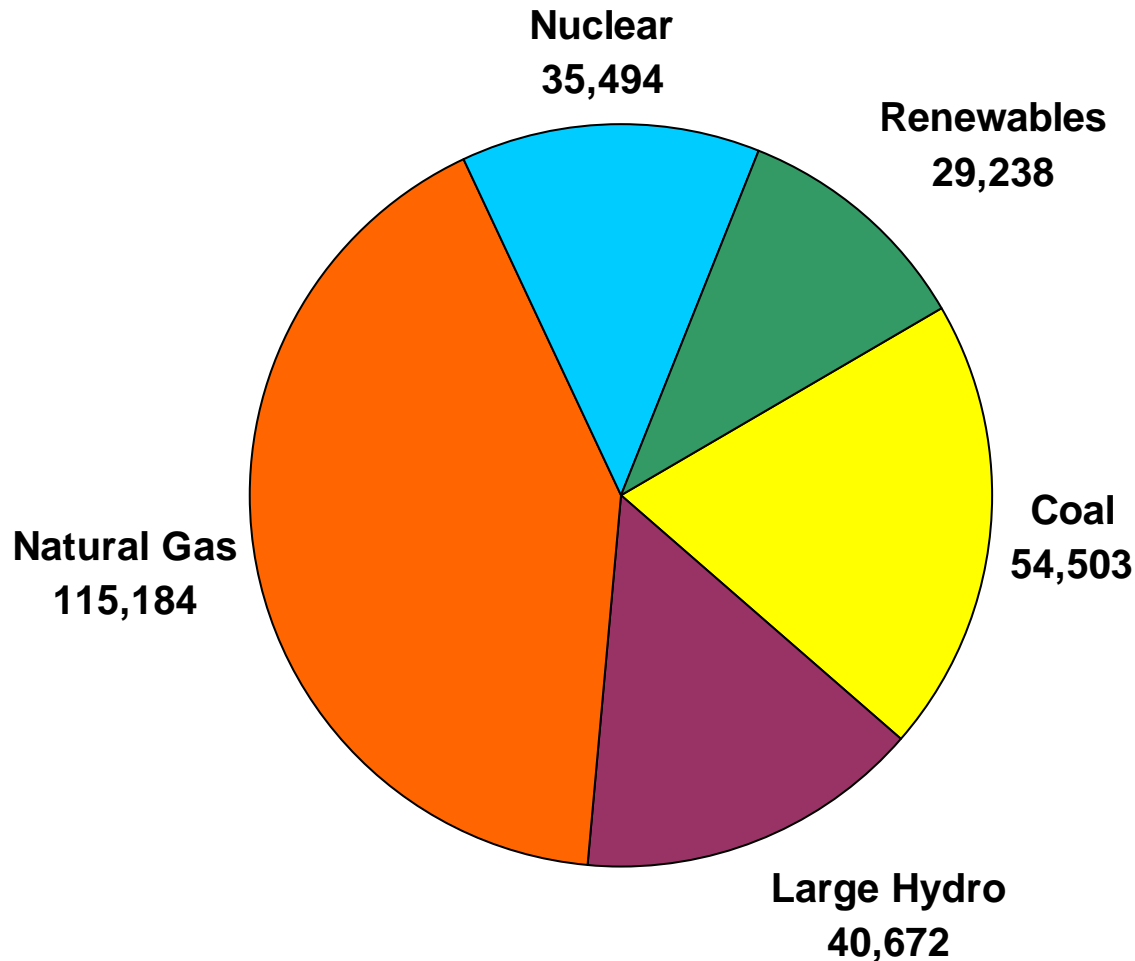
2. California's Operating Nuclear Power Plants

California's Operating Nuclear Power Plants

Nuclear Plant	Unit	Size	Operator	California Ownership	Date Began Commercial Operation	Expiration of Current License
Diablo Canyon	Unit 1	1087 MW	Pacific Gas and Electric	Pacific Gas and Electric	May 7, 1985	Sept 22, 2021
	Unit 2	1087 MW			Mar 15, 1986	Apr 26, 2025
SONGS	Unit 2	1070 MW	Southern California Edison	Edison International (75.1%), SDG&E (20%), Anaheim Public Utilities Department (3.2%), Riverside Utilities Department (1.8%)	Aug 8, 1983	Feb 16, 2022
	Unit 3	1080 MW			Apr 1, 1984	Nov 15, 2022
Palo Verde	Unit 1	1243 MW	Arizona Nuclear Power Project	SCE (15.8%), SCPPA (5.9%), LADWP (5.7%)	Jan 28, 1986	Dec 31, 2024
	Unit 2	1243 MW			Sep 19, 1986	Dec 9, 2025
	Unit 3	1247 MW			Jan 8, 1988	Mar 25, 2027

California: 2004 Gross System Power

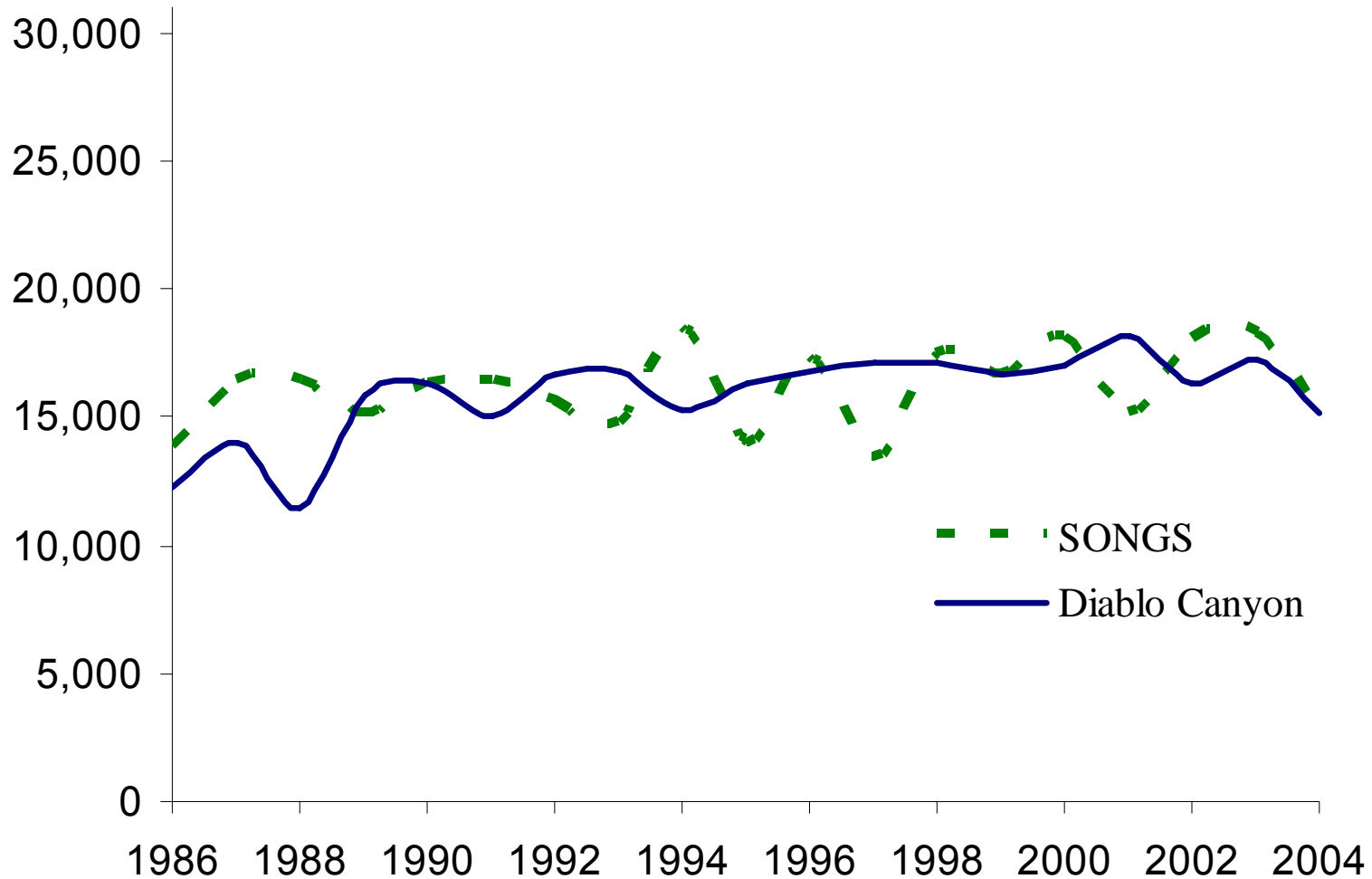
(GWh)



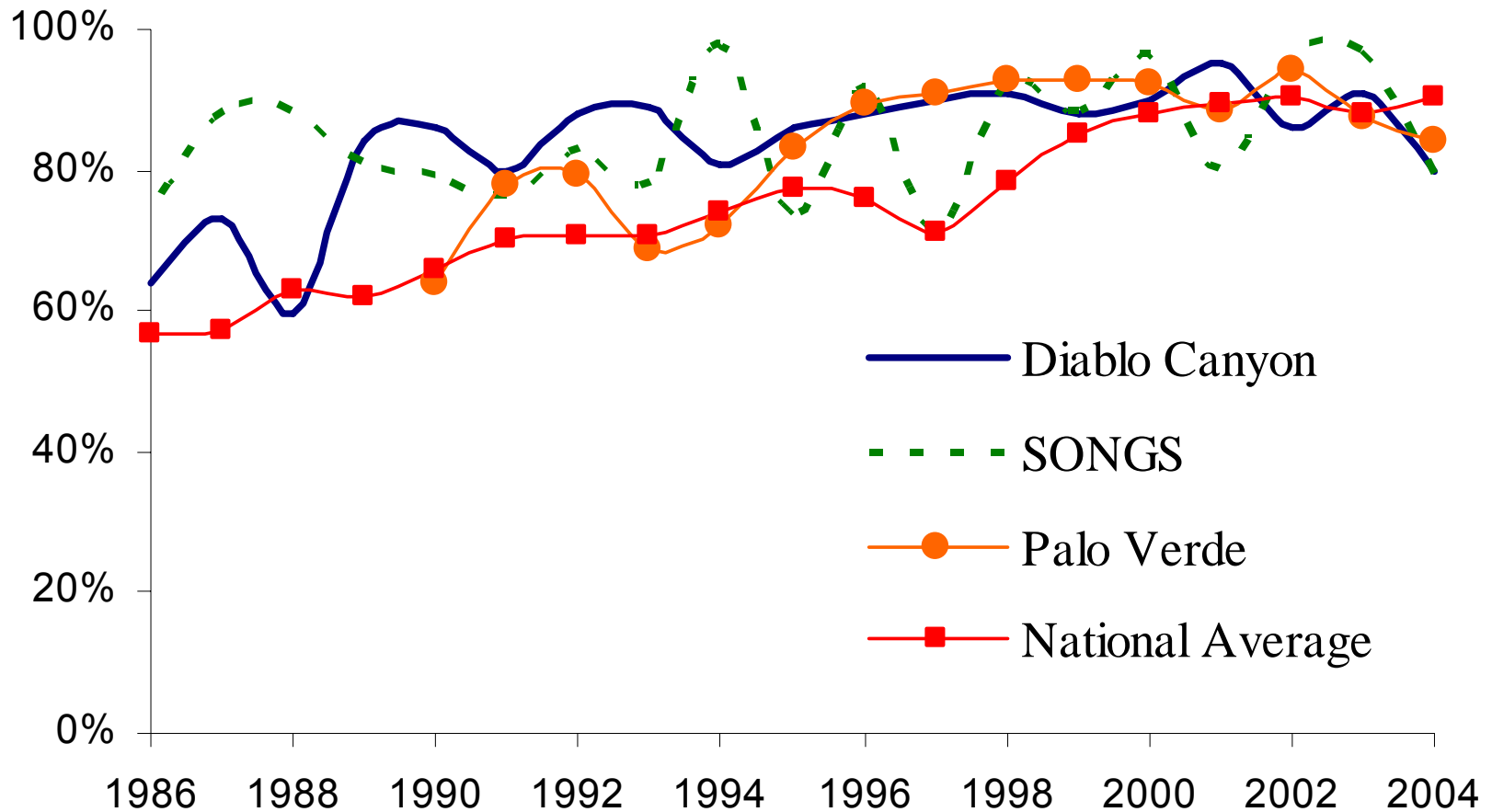
Source: California Energy Commission

Electricity Generation

(millions of kWh, exclusive of plant use)



Capacity Factors



Benefits of Operating Plants

- ❑ Substantial cost for replacement power
- ❑ Transmission upgrade investments may be needed if SONGS not available
- ❑ No contribution to greenhouse gases
- ❑ Fuel diversity
- ❑ Displace demand for natural gas
- ❑ Reduced air emissions

Costs of Operating Plants

- ❑ Steam generator replacement projects:
 - Diablo Canyon → \$700-800 million
 - SONGS → \$700 million
- ❑ O&M and fuel costs
- ❑ Unanticipated capital expenses
- ❑ Accident risk at other nuclear plant
- ❑ Insurance premiums
- ❑ Contributions to Nuclear Waste Fund
- ❑ Indefinite on-site accumulation of spent fuel

3. Status of Key Nuclear Energy Issues

Yucca Mountain Waste Repository

- ❑ Court-ordered revised EPA standard on maximum radiation dose for EIS
- ❑ No license application with NRC to date
- ❑ Publicly stated earliest date of operation is 2012
 - this date widely believed to be unachievable
- ❑ Nevada strongly opposed; likely to continue to mount legal challenges
- ❑ 70,000 MTHM capacity vs. estimated 120,000 MTHM of nuclear waste

Spent Fuel Pools

- ❑ Original design capacity assumed transferring spent fuel to off-site storage facility
- ❑ Now nearing engineering/safety capacity limits due to re-racking
 - Loss of FCOC approaching without added storage:
 - ❑ 2007: Diablo Canyon 1/SONGS 2
 - ❑ 2008: Diablo Canyon 2/SONGS 3

Dry Storage

Location	Casks	Assemblies	Status
Diablo Canyon	140	4,400	License Approved
Humboldt Bay	5	390	License Pending
Rancho Seco	21	493	Loading Complete
SONGS	104	2,496	Loading Underway

- ❑ Dry-cask storage will “buy” time until a permanent repository exists
- ❑ Conflicting assessments of the safety of dry casks from terrorist attacks

Transportation of Spent Fuel

- ❑ Few incidents with spent fuel shipments
 - 1979-1995: 8 accidents; 1,300 shipments
 - Safety record compares favorably to shipments of fossil fuel
- ❑ Volume and number of shipments will increase substantially once central repository/storage operates
- ❑ Significant cost impact with increasing shipments
- ❑ Significant California impacts depending upon routes selected
- ❑ Conflicting assessments of terrorism risks to spent fuel shipments

State Fees for Nuclear Waste Transport

State	Transportation Fee
California	\$100 annual fee per carrier \$75 annual renewal fee
Colorado	\$500 annual permit fee \$200 additional per trip
Illinois	\$2,500 for the first truck cask plus \$25/mile for each mile over 250 miles in Illinois \$4,500 for the first rail cask \$3,000 for each additional rail cask
Indiana	\$1,000 per cask
Iowa	\$1,750 per highway cask plus \$15/mile for each mile over 250 miles in Iowa \$1,250 for the first rail cask plus \$100 for each additional rail cask
Nevada	\$500 permit fee \$150 additional per truck plus Plus additional fee assessed
New Mexico	\$250 annual fee or \$75 per shipment fee
Oregon	\$500 annual permit fee or \$70 per shipment, whichever is less
Pennsylvania	\$1,000 per shipment Pennsylvania State Police assess escort fees
Tennessee	\$1,000 per cask for truck shipments \$2,000 per cask for rail shipments
Wyoming	\$200 permit fee per package

Future Policy Considerations

- ❑ Contribution to electricity supply: nuclear power vs. alternatives
- ❑ Safety and security issues
 - at-reactor spent fuel storage in absence of permanent repository
 - at-reactor storage vs. transport to interim off-site storage
- ❑ Frequency and quantity of spent fuel shipments on California roadways
- ❑ Potential extensions of operating licenses for Diablo Canyon and SONGS

4. Implications for California

Lack of Permanent Repository

- ❑ Conditions of state law not met
 - No new nuclear power plants in California
- ❑ Significant costs to consumers
 - Monies paid in to Nuclear Waste Fund with no payback
 - Alternative storage required
- ❑ Reliance on at-reactor interim storage
 - Additional safety concerns not previously considered
 - Decommissioning plans may need to be re-assessed

Diablo Canyon/SONGS Status

- ❑ Mitigating costs while maximizing benefits from continued operation
- ❑ Resource supply strategy to backstop power
- ❑ Diablo Canyon and SONGS are aging power plants:
 - Unexpected maintenance/capital costs
 - Safety concerns
 - Workforce training and replacement
- ❑ PG&E will study feasibility of license extension

Written comments from interested parties should be submitted no later than August 23, 2005. Please see the Workshop Notice for submission guidelines.